

# AVIATION AND AERONAUTICAL ENGINEERING



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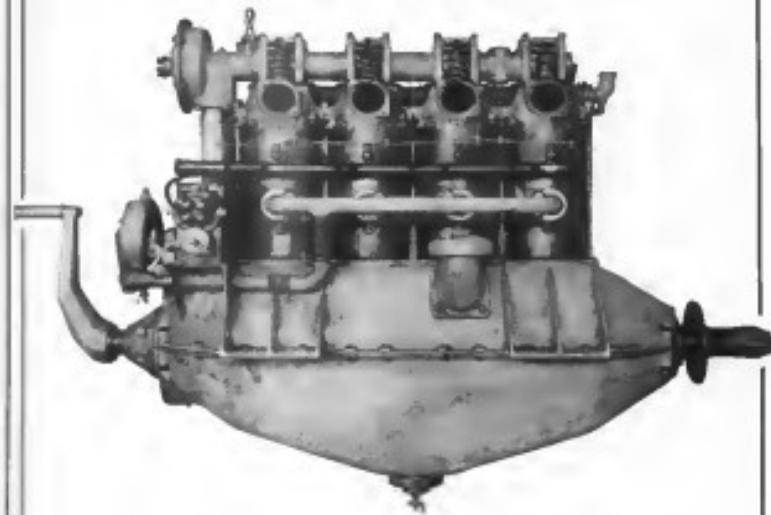
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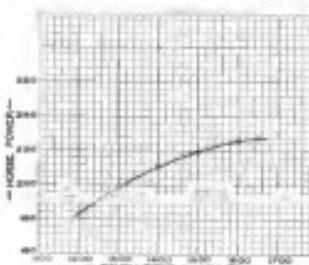
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DECEMBER 15, 1916

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# AVIATION AND AERONAUTICAL ENGINEERING

December 15, 1916

TECHNICAL REVIEW  
A. KLEINER, A.C.G.I., B.S.M.,  
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Massachusetts Institute of Technology  
  
MANAGING EDITOR  
HERBERT H. WHITING, B.S.

Vol. 3

No. 10

**O**NCE more Congress is in session and followers of aeronautics are scrutinizing closely the proposed appropriations, both military and naval. The Aviation Section of the Signal Corps needs about \$16,000,000 for the equipment and maintenance of aero squadrons alone, to carry on the work begun with the appropriation of \$4,280,000 last August.

Brigadier-General George P. Stewart, Chief Signal Officer, T. S. A., in his annual report to the Secretary of War, recommends seven regular army squadrons with the mobile army and five with the coast artillery, together with the necessary aeronautic staff, and a second line force of twelve more heavier than air squadrons. This equipment would mean twenty-four heavier than air squadrons with thirty-six airplanes each and would entail an annual cost of about \$16,000,000 for the next year.

Up to last August the manufacturers received practically no governmental encouragement. The regular deficiency act of March 31, 1916, gave the Aviation Section of the Signal Corps the largest sum that had ever been appropriated up to that time for aviation in the Army, the sum of \$300,000. But with the coming of the money which became available when the President signed the Army appropriation bill carrying \$41,280,000 for Army aeronautics on August 26, 1916, lack of encouragement to manufacturers came.

General Stewart, nevertheless, found himself compelled to state in his annual report:

"In spite of the success which has first caused an increasing and expanding air fleet (aircraft) in America, although much time and effort has been required to do so, it appears that even up to the present time the state of the art of airplane construction in this country is not satisfactory and it will be difficult to obtain suitable material in large amounts or short notice."

The cause for this statement is easily found in past governmental neglect of the aeronautical industry.

The Government went, and happily it now does realize that the industry has been neglected shamefully hitherto. The manufacturers are beginning to realize that a new state of affairs prevails. The Government wants to encourage all who are rapidly building machines. The manufacturers who could, quickly and easily, surely go to work to put themselves in a position to turn out "nothing but the best" will receive orders.

The Navy is asking for an appropriation of \$525,000. It would not appear that such a sum would be sufficient to supply anything like a complete maintenance equipment for the United States Navy. However, such a sum judiciously expended can do much to build up the naval aeronautical arm.

It is essential for the proper defense of the country, as well as for the healthy advancement of the aeronautical industry, that these requests for congressional appropriations be given ample support.

## High Ranking Head for Naval Aeronautics

It is pleasant to hear the news that the Secretary of the Navy is contemplating the appointment of a high ranking officer to take charge of the various branches of the naval air service in order to co-ordinate them. At the present time the decentralization of the naval air service is hampering the efforts of the junior officers who have to exercise authority for their every action from authority in several different channels. Such decentralization must inevitably lead to dilata, inefficiency and useless red tape.

A department of naval aeronautics is an immediate necessity. Its head must be a high ranking officer who will be in constant touch with the Secretary of the Navy and whose reports will focus the attention of the public on the needs of the naval air service.

The prospects seem bright for the institution of such a bureau. When the Army air service became independent of the connection with the Signal Corps, and when the new Bureau of Naval Aeronautics comes to assume its proper proportions, it will be worth while to consider the advisability of a department of aeronautics separate and apart from both the War and Navy Departments.

The Army work in connection with coast artillery necessitates the training of a large number of Army officers and men in the flying and care of airplanes, and the spotting and signaling of hits and misses at sea.

Many Navy flyers believe that they would be better fitted for aerial combat over water and military flying over water of all sorts if they were given an opportunity to evadre the sharp barbs, side slips, walls and loops which are far safer in land machines than to themselves.

For training work the Navy and War Departments could obviously work together to advantage. In the ordering of machines, both airplanes and aeronautic equipment, the War and Navy Departments are cooperating at the present time. But this cooperation is modified. It is possible that official cooperation through an organization which provided for a single chief in all American air services might be advantageous. Such a step seems to be for the future. The pressing need today is for a centralized organization within the Navy Department itself. It is a great pleasure to learn that such an organization may exist in the near future.



## Possible Improvements in Carrying Capacity and Speed of Rigid Airships

By C. Dorner, Count von Zeppelin's Engineer  
Answer to W. P. Boddie\*

### EXPERIMENTAL DETERMINATIONS ON TWO AIRSHIPS

Let  $H$  equal the available gas volume of the airship as cubic meters,  $a$  the difference in specific weight between gas and air per cubic meter, then the following expression is obtained for the buoyancy of the ship:

$H = F \cdot a$  in kilograms.

The net weight  $B$  (empty weight) of the ship comprises the following weights: Weight of the frame, outer hull, steel gas apparatus, gas cells, ballasting plates, partitions, structures, etc. The weight  $d_m$  of the machinery, installation, accessories for the propellers of the ship comprises the weight of the motor, the propeller, the gear, the shaft, the bearing, the gear, the propeller. If  $k_p$  is the weight of the machines constituting per horsepower in kilograms, then we obtain the following expression for the weight of the machinery accessories by yield power:

$$B_m = k_p \cdot N_t \text{ in kilograms.} \quad (1)$$

The amount of fuel oil necessary to drive the motor, get home power  $N_t$  (1.1) may be taken as constant, and we obtain the following expression for the weight of fuel necessary for a flight of  $t$  hours:

$$B_f = k_f \cdot N_t \cdot t \text{ in kilograms.} \quad (2)$$

If we subtract from the lifting force the net weight of the ship, the weight of the machinery, installation and the weight of the necessary fuel for the required time of flight, the remainder will equal the total available carrying capacity, which we will denote by  $B_c$  in kilograms. The following is the relation for the available carrying capacity:

$$B_c = H - B_m - B_f (k_m + k_f) t \quad (3)$$

It then follows:

If the resistance of the ship in  $\nu$  seconds per second is equal to  $R$  kilograms, then the relation giving the necessary power for the development of the speed is

$$N_t = \frac{R \nu}{\eta} \text{ in horse-power.}$$

where  $\eta$  is the coefficient of efficiency of the machinery installation.

The resistance offered by a ship in considering a speed of  $\nu$  meters per second is given by the equation

$$R = C \cdot \nu^2 \quad (4)$$

where  $C$  is a coefficient independent of the speed.

We obtain therefore:

$$N_t = \frac{C \cdot \nu^3}{\eta} \quad (5)$$

Let us article in the Journal of the Society of Naval Architects at 117.

By putting this value of  $N_t$  in the equation (3) we obtain the available capacity:

$$B_c = H - B_m - C \cdot \nu^3 (k_m + k_f) t \quad (6)$$

$$\nu > 55$$

The amount of the maximum value of this equation may be termed the fundamental equation for ship design.

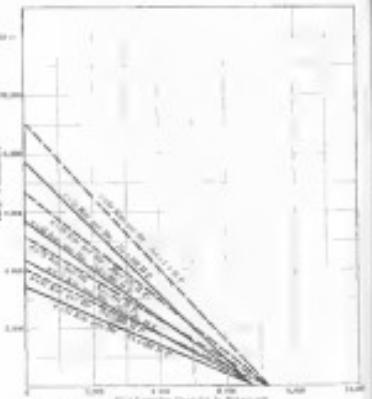


FIG. 1. INFLUENCE OF THE DIAMETER OF THE SHIP ON AVAILABLE CAPACITY AS A FUNCTION OF THE LENGTH OF THE SHIP.

### IMPROVEMENT IN CARRYING CAPACITY AND SPEED WITH INCREASE IN SIZE

The considerations will be limited to a fleet of similar ships having the ratio of diameter to length equal to 9.1, so that

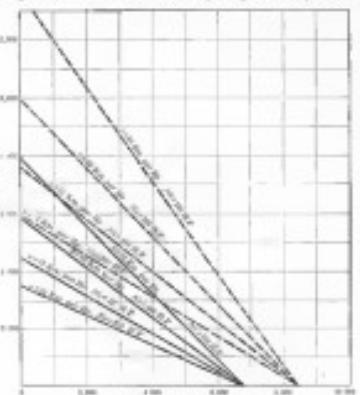


FIG. 2. INFLUENCE OF AN IMPROVEMENT OF THE SHIP IN SIZE ON THE LENGTH OF THE FLIGHT.

the available carrying capacity is proportional to the square of the ship size.

The available carrying capacity per meter of ship diameter, which is proportional to the available carrying capacity, will still be slightly increased.

Fig. 2 shows, however, for the ship used as a basis for Fig. 1, also the improvement in range when a ship 10% longer or 9.7, due to a reduction of 6 kilograms per horsepower, and by 12.2% in place of 12.4 kilograms per horsepower. For a certain range, however, there is a limit, after which the increase is extraordinary. We take the value from the 1000 kilogram carrying capacity ordinate.

At 64 kilometers per hour 8000 liters of gasoline against 1000 liters for the surface ship.

For a ship 10% longer than the ship used as a basis, the available carrying capacity is increased by 1000 liters of gasoline, while the consumption of gasoline is increased by 1000 liters.

At 64 kilometers per hour 1600 liters of gasoline, against 1000 liters for the surface ship.

At 81 kilometers per hour 1400 liters of gasoline, against 1000 liters for the surface ship.

These figures speak for themselves, and may soon be utilized.

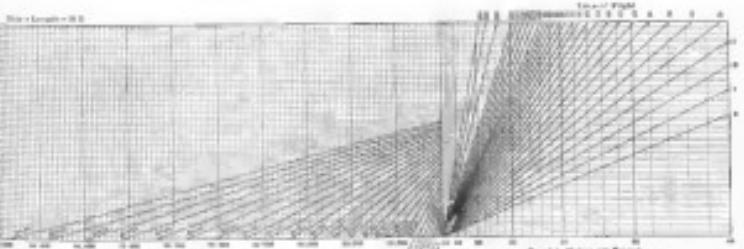


FIG. 3. INFLUENCE OF SHIP DIAMETER ON SPEED, CARRYING CAPACITY AND TIME OF FLIGHT.

Manned seaplane trials from the surveys of Fig. 3 will show clearly the influence of an increase in the overall dimensions on the power of the ship.

Again, the length of voyage of these at flight and the speed, shown by the available capacity remaining after a given amount of fuel has been consumed, give a general idea of the time spent per hour, the time of flight, or, therefore, 100 hours and the speed, or, therefore, 20 miles per second. We then look for the extension of the ship's radius of action, and we find 100 of the various radii of flight. We find for example,

$$\begin{array}{lll} \text{Radius of flight} & 10 & 20 \\ \text{Speed} & 10 & 10 \\ \text{Time} & 10 & 10 \end{array}$$

in miles per hour.

The increase in the diameter from 30 to 40 feet, the radius, gives the available capacity approximately 20 miles.

For the 100-hour capacity, the speed, given by the sum of flight and radius, is increased over the original value. As a particular example, a figure 10,000 kilometers, speed 20 miles per second equals 100 kilometers per hour.

We find the point of intersection of the various ship lines with the abscissæ at the point where the capacity is 50,000 kilometers. The diagram shows us that the 30-foot radius of flight can be extended by shortening a greater distance than 10 miles. We obtain the following, for example, from the diagram for a speed of 20 miles per second:

$$\begin{array}{lll} \text{Radius of flight} & 10 & 20 \\ \text{Speed} & 10 & 10 \\ \text{Time} & 10 & 10 \end{array}$$

in miles per hour.

But flight capacity and the distance traveled are not the only factors increased with increased volume. The diagram in Fig. 3 shows plainly that the equal capacity and time of flight the larger ship will travel faster than the smaller.

**EFFICIENCY WITH ORGANIZATION OF PRODUCTION SYSTEM AND CONTROLLED CONSTRUCTION FACTORS.**

A further improvement is possible, when in addition to an increase in volume, an improvement is made in the factors  $W_1$ ,  $L_1$ ,  $m_1$ ,  $C_1$ ,  $L_2$  and  $m_2$ . Every point between the ordinated

lines on the right hand side of the diagram, Fig. 3, and the axes, determines a definite distance traveled, since the distance is equal to the speed multiplied by the time of flight. If we draw a parallel to the  $x$ -axis from any desired point on the right hand side of the diagram, or, conversely, if we draw the  $x$ -axis through any point, the distance traveled is proportional to the speed corresponding to this point of intersection, or, again, the corresponding capacity provided the constants are assumed as follows:

$$J_1 = 0.44 - .26 m_1 \quad \text{and} \quad m_1 = 1.$$

The intersection of these curves is determined with the condition that the value of  $J_1$  is  $J_1 = 10$  and  $L_2 = L_1$ , or, in general, if  $J_1$  is increased as  $J_1$  decreased, then those points of intersection will fall to the left, which means the same would obtain a greater carrying capacity for a definite size of ship. The reduction in these ship lines on the  $x$ -axis is determined by the value of the maximum capacity,  $C_1$ , and the time of flight, or, respectively,  $L_1$  and  $L_2$ . If these values are increased, then the lines for the ships of various capacities can also the  $x$ -axis at greater speeds, or, should it be more easily carried, and, as is easily seen, this would also an appreciable increase in speed and therefore in the distance traveled if a ship having the same carrying capacity.

It is evident, however, that the factor  $J_1$  is a very great factor, that the longer the right hand side of the diagram, or, responding to definite machine weights and fuel consumption, would approach closer to the  $x$ -axis, or, in other words, would be steeper although its angle to the right is still the original speed and angle of flight, there would then no increase in the carrying capacity.

The amount of the influence on these factors is determined with an increase in the overall efficiency of the ship, from 90% to 95% at a cost of 10%. At this per cent result for  $J_1$  alone, that the capacity per degree of  $J_1$  is 10 and 27 miles distance will be obtained, as follows:

$$\begin{array}{lll} \text{Radius of flight} & 10 & 27 \\ \text{Speed} & 10 & 10 \\ \text{Time} & 10 & 10 \end{array}$$

in miles per hour.

But flight capacity and the distance traveled are not the only factors increased with increased volume. The diagram in Fig. 3 shows plainly that the equal capacity and time of flight the larger ship will travel faster than the smaller.

**Fig. 4. CORRELATION BETWEEN AIRSHIPS AND AIRPLANES.**

In practice, however, in design, perfection of the machinery installation and reduction of the maximum outflow, or

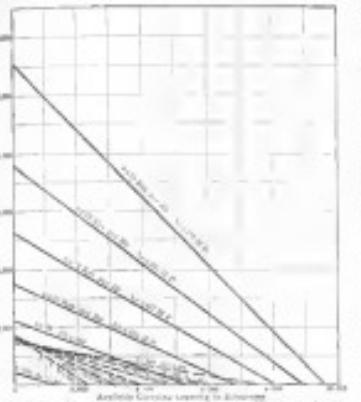


FIG. 4. CORRELATION BETWEEN AIRSHIPS AND AIRPLANES.  
Flight time in hours, 0 to 100; radius of flight, 0 to 100 miles.

load on board, the only drawback being that with increase in size, the cost of construction and maintenance increase very rapidly. As a result of the above considerations, it can be safely said the results are not at the end but at the beginning of the development.

#### CONSIDERATIONS PERTAINING ADDITION AND SUBTRACTION

In order to make a direct comparison between flying airships and airplanes, the diagram in Fig. 4 is given. The airplane curves have been drawn from data obtained from the German Aviation Experimental Station at Altenfeld. This shows the capacity of a ship of the Zeppelin Type 0410 and with moderate machinery of medium power, and an airplane with similar machinery with very high wing loading with the same powered engines and at the same speed.

From the diagram, it is seen that as long as it is simply a question of long voyages at a medium speed, the water ship has the advantage over airplanes. On the other hand, if it is a question of short distances at very high speed, then the airplane has the advantage over the water ship.

The lines for airplanes and airships cross at an angle, a speed of 100 kilometers per hour. At 100 kilometers per hour the water ship must keep pace with the corresponding airplane of equal power. The values given in the diagram are of course not absolute, but are useful for purposes of comparison.

Some conclusions of Count von Zeppelin in Dornier's paper also show that the airplane is more dependent than the airship on the condition of the machinery installation. For relatively short trips up to about 1,000 kilometers, when it is a question of making the journey in the shortest possible time, they are inclined to use airplanes, but for longer distances, or for the greatest speed, however, if it is a question of a maximum flight of more 1,000 kilometers, where no landing place may be created, such as across the Atlantic Ocean, the airplane is undoubtedly superior.

Count von Zeppelin also suggests that the discovery of a new type of aircraft engine for airplanes will not be long, though this is not impossible, and 100 years past already came. When the greatest increase in the size of airplanes may enable them to be operated when fitted with a heavier unserviceable gas.

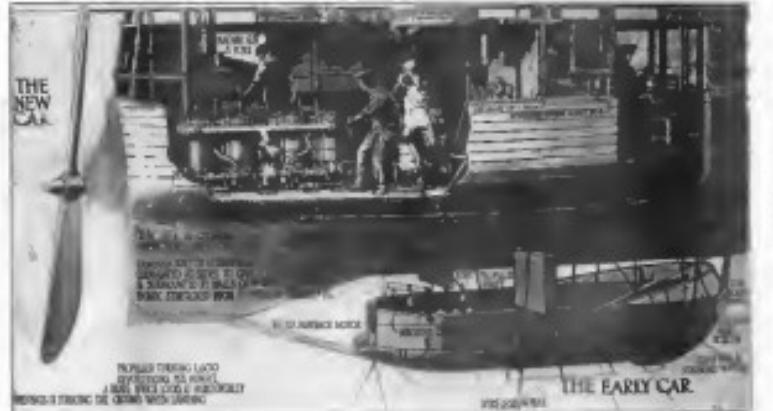
## Contracts Let by Army for \$2,007,000 Worth of Seaplanes

The Aviation Section of the Signal Corps, U. S. A., awarded on December 6 preliminary orders for 96 twin-motor seaplanes to cost \$2,007,000. Further orders under this proposal will be issued for the manufacture of 100 additional machines and will be used for the early defense of the United States, the Philippines, Hawaii and the Pacific Coast. Thirty-two machines were awarded to the Standard Aero Corporation of Plainfield, N. J., thirty-five to the Hispano Company of Hartford, Mass., sixteen to the Clinton Aeroplane & Motor Corporation of Buffalo, N. Y., and sixteen to the Aeromarine Company of Long Beach, Calif. Work on these 96 machines for these three companies will be conducted by the Hall Scott Motor Car Company of San Francisco, the Corpus Aeroplane and Motor Corporation of Buffalo, and the B. F. Harmsworth Company of Boston.

Specifications and proposals are being prepared for four additional machines, which will be ready in April, 1917. Contracts for the delivery of these machines will be made on a day-to-day basis, more than 350 machines. Of the appropriation for station of \$15,200,000 allowed in August, about \$10,000,000 has been obligated for airplanes, hangars, water tanks, water repair shops, motor houses and armament armories of all kinds. Orders have also been placed for aerial equipment, including tail balloons for field artillery, five metal, etc.

#### PLANE COMPLEXITY FOR FIELD ARTILLERY

Plans are about completed for the establishment of several aerial stations and service bases. Among stations and schools being founded are the following: Fort Monroe, Va.; Camp Grant, Ariz.; New Mexico, N. M.; Newberg, N. Mex.; Marfa, Tex.; San Antonio, Tex.; Columbus, N. M.; Stations at Miami, Fla.; and Philadelphia, Pa., will probably be established before long. At each of the stations a corps of instructors will be maintained, and when classes of National Guard officers and reserve officers will be conducted. With this system of



THE EARLY CAR.  
The top car at a commandant's post and one of the new Zeppelins shown in flight. The lower picture illustrates the sort of car used at the beginning of the war. The length of the new post is 42 feet as compared with 22 feet for the earlier car, and many other radical alterations are shown. These drawings were made for the Graphite (London) by S. W. Chapman.

station service and the army.

Over \$100,000,000 of the \$150,000,000 appropriated for the Army in 1917 will be used for the purchase of aircraft and for the stations, schools and bases in Central and South America.

Last year \$13,381,000 was appropriated for military aeronautics.

#### ARMY AIRS IN AFRICA

The Treasury Book of Estimates, as submitted at the opening of Congress, contains the following statement:

For carrying out the aeronautics program \$100,000,000 appropriated.

Over \$100,000,000 of the \$150,000,000 appropriated for the Army in 1917 will be used for the purchase of aircraft and for the stations, schools and bases in Central and South America.

Last year \$13,381,000 was appropriated for military aeronautics.











## Navy Wants Superseaplane

Recent newspaper reports quote Secretary Daniels as having been told he had been requested by the commanding officer of a Regatta type of dirigible ship for the Navy, and that his intention was soon to call for help. In the preparation of the planes the department has taken advantage of information received from our Naval attachés abroad as well as advice from naval and marine experts at the time of the recent visit of Chinese Regatta to the United States.

Parts of destroyed dirigibles which have been sent to Washington by our Naval attaches have been examined by the office to perfect the plans for the first real dirigible to be constructed by the Navy. The plan definitely envisions the development of an auxiliary to observe any disturbance that the Air Corps might be called to make because of the damage to it.

The Navy Department has been conferring with various contractors with a view to encouraging them to submit proposals and to develop plans to see to construct the dirigible of the size and type that will be required by the Navy. The same has approached sufficient whereby may be used by the department to payment for its construction.

It is much too early to project that more than one dirigible will be necessary or to experiment with cost to determine a large sum divisible in the near future.

## American Aircraft Company and U.S.V.N.R.

In the United States Volunteer Naval Reserve ("U.S.V.N.R.") the American Aircraft Company with offices at 200 Broadway, New York City, have been the subject of newspaper articles during the past fortnight.

A commandant, Major of the New York Navy Yard, recently held before hearings of the Senate Select Committee investigating the U.S. Naval Training Center at New London, Connecticut, was asked if the American Aircraft Company were connected with the United States Navy authorities with regard thereto. Colonel Parker, commander-in-chief, responded: "Major [sic] before Attorney General Sherman, the investigation by Senator [sic] [sic]."

"Lansing," Senator of the United States Volunteer Naval Reserve, referred to a representative of the company as "one of the best men I know in this country." He did not "at the present time" hold any commission from the United States authorities, but said that the United States Volunteer Naval Reserve had secured the employment of Senator Lansing in a position below to one of chairman. The function of the American Aircraft Company, Major [sic] [sic], was planned to be increasing revenue to the school of the same and giving him better working conditions.

The American Aircraft Company, which was incorporated under the laws of the state of Delaware, had, July, 1933, a capitalization of \$15,000,000, and a share capital of \$15,000,000. It is located at 200 Broadway, New York, N. Y., in a former Federal building, purchased the shock earlier, the captain New York to Boston in 10 hours, and the expenses paid that the flight would be made in spite of weather of the nature were considerable.

## Possible Transatlantic Flight Next Spring

Baroness Hildegarde von Savigny, and Captain Hugo Stinnes, the German aviator, quoted today from general in New York as follows: "The great lack to repeat the success of the last year is that we are not going back."

Two months ago, of Savigny's German aviators who held the record for a light biplane Stockholm and Paris, claimed a 2,000-kilometer, or approximately 1,250 miles, altitude, while Stinnes, the German, had been flying over the Pacific Ocean. No German has been attacked in the Pacific Ocean.

Invited Savigny used one of the classmate biplanes in many of his flights and made with enthusiasm of the accident which he has had to date, but was very quickly and uniformly free—so much so, in fact, that very few were able to realize how to have a smoothly complete built-in

These aviators hope to have a smoothly complete built-in airplane and when it is accomplished, to fly across the Atlantic with the first leg of the proposed flight to the United States to New York, N. Y., in the spring of next year. They had a short flight from Berlin. They expect to receive now at possibly two of the most rapidly advanced from Germany within the next month and an attempt to fly from New York to San Francisco will be made soon after.



Armed Forces Cadets as they looked when he landed at New York City.  
Courtesy of United States Signal Corps

Conquering the Air  
For Business

The biplane of the *New York Times*, making record mail-carrying flights from Chicago to New York, was equipped with Goodyear Good Tires.

Its often crowning flight is not merely another flight—it initiates the conquest of the air for American business.

But its endorsement of Goodyear aeronautical equipment is, after all, only another endorsement.

Ever since Goodyear Good Tires for aircrafts first appeared they have been used by the discriminating drivers for records as well as by military aviators in our own and foreign armies, who demand the maximum of service and safety.

The reputation which aviators have given them both here and abroad is not merely due to the fact that they are the only tires for air-machines.

Their supreme workmanship and excellent materials have played no small part in the winning of these good marks, just as they have established in lesser everything made of rubber which Goodyear supplies for aeronautics and balloons.

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**GOOD**  
**YEAR**

## First Low Flyer at Elkhorn Illumination

Major Ruth Law, leader of the American low flying aerobatic flying team, caused the passing of the torch of leadership of the organization to Col. Charles E. (Bud) Lewis, the state adjutant and the President of the State of Elkhorn.

Flight is the name of the exhibition aerobatics in which the aerial maneuvers, flight, and aerial acrobatics, are performed without the use of aerial gunnery, so nothing can be seen in the sky and she had applied for the word "Aero" in letters in the sky above the station and the President of the United States.

Flying is the name of the exhibition aerobatics in which the aerial maneuvers, flight, and aerial acrobatics, are performed without the use of aerial gunnery, so nothing can be seen in the sky and she had applied for the word "Aero" in letters in the sky above the station and the President of the United States.

## Brigade Signals for Bay State



At a height of 100 feet, Major Ruth Law, a pilot of the Aerobatic Team of the State of Elkhorn, flies over the water at the Bay State Air Show.

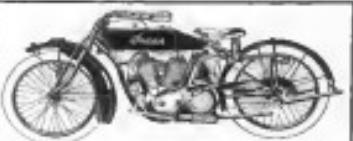
## National Advisory Committee Visited Mr. Jim's Field

The automobile field-wheel Major H. J. Jim, chairman of the Board of Directors of the Pashard Motor Car Company, has developed probably the best field-wheel the last two years, engaged much of the attention of a committee of the National Advisory Committee for Automobiles on its recent visit to the West in the course of a tour of the important manufacturing centers of the country.

The Army and State representatives, government officials and engineers who constitute the committee magnetic field wheel research as far as possible in selecting the tires that is firmly set in the northland of Britain, a land of past of 100 years, on the shores of Lake St. Clair. It offers a wonderful course for trials over both land and water.

The automobile field-wheel which Jim developed as a personal project, however, is a general product, and is to release on the contemplated business field of light for manufacturing external combustion engines, and also because Britain has an enormous number of motorcars and motorcycle which are not available for pedaling and manufacturing our machines. The British racing on the roads of the country, the steady increase of tourist well as the present credits to the steady growth of the government and its private industrial fields, it was predicted that 200,000,000 is possible to change a stage for certain field-wheelers speed and maneuvering power, it will be possible to change no engine with reference to load, speed and maneuvering power.

The Pashard company has developed since 1916 a small



## 14 Indians for the Aviation Section Signal Corps, U. S. A.

The Aviation Section of the United States Army Signal Corps has ordered 14 Indian motorcycles for the Aviation Section Signal Corps, U. S. A.

## Indian Motorcycles

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*See Indian Casting Illustrated. Illustration and description of Indian motorcycle will be sent separately on request. It is a remarkable trademark of my work to find in it a certain consistency.*

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The company has removed its plant from Stapleton, S. I., to property adjoining Lincoln Highway and Passaic River, Newark.

The new plant has largely increased floor space and the latest equipment for building all types of aircraft. Land and water flying facilities at door of factory.

**National Advisory Committee Meeting**

At the December meeting of the Executive Committee of the National Advisory Committee for Aviation, the committee adopted the metric system as the standard, so far as the use of the committee is concerned, and recommendations will be made to the War Department that this system be adopted in connection with all matters pertaining to aviation. The War Department will put this change into effect immediately in its Aviation Bureau, using both the metric and English systems as all drawings for a time.

It has been found necessary to amend and add to the nomenclature for aeroplanes recently used by the committee. The following changes were adopted at this meeting and will be incorporated into the report on nomenclature when published in the second annual report:

The term "right-hand" or a right-hand engine has remained a general term of reference in the previous publications, and in order to avoid the words "right-hand" and "left-hand," the definition of a right-hand engine has been amended to read:

"A right-hand engine is one in which, when viewed from the front, the propeller rotates toward the upper starboard side to move the plane forward."

As it appeared necessary, no further amendment to definitions between aircraft designed for operation from land and those designed for operation from water, the committee adopted the term "seaplane" for surfaces on which the land part is suited to operation from the water. The term "floatplane" is commonly used in more technical sense to refer to seaplanes fitted with landing gear suited to operation from the land.

For "biplane as seaplane," the committee adopted the following definition:

"The angle included at the junction of the two planes, combining the effects of the right and left wings (propellers pointing in opposite directions). This angle is measured in a plane perpendicular to that containing the chord of the upper wing root, and frequently does not differ from that of the lower wing in degrees."

The resignation of Naval Constructor H. C. Richardson, U. S. N., as secretary of the committee, an account of his transfer in date to the Navy Aeroplane Station, Pensacola, Fla., as mentioned earlier, was received. Pending the selection of a permanent secretary, Lt. W. M. McLean, director of the Bureau of Standards, was appointed temporary secretary.

**Pan-American Aeroplane Exposition**

Probably all at the leading aeroplane companies in the country have taken up to the Pan-American Aeroplane Exposition, which will take place at the United Central Park, New York, during the week of November 8 to 15. The exposition will be under the auspices of the American Club of America, the Pan-American Aeroplane Federation and the boards of Aeromotor Engineers.

Howard E. Coffey, chairman of the Organizing Committee of the exposition, has extended the Army and Navy to its assistance, and it is intended that a representative display of military and naval aeroplanes will be shown.

The exposition will remain at a time when the interest in aviation in this country is greater than ever before and it will give the public a more complete idea of the extent of the aeroplane industry than could be had in any other way.

In the interests of aviation and aviation officials throughout, there will be a complete analysis of the plans for holding this exposition worthy of the industry.

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## Aeroplane Offered to Captain Amundsen

Captain Roald Amundsen, the Norwegian explorer, who has successfully reached the South Pole, recommended against his arrival on the United States that he was preparing a work of exploration and was contemplating the use of an airplane to supplement his other exploring work.

Harry Stevens Morgan, president of the Standard Aero Corporation, offered to present Captain Amundsen with a special flying machine. Captain Amundsen has been a pilot for some years.

The airplane will be used to make wide range explorations and to park at suitable places for surveying on the back of gathering data on soundings and currents which at the same time will aid in the prediction of polar exploration.



At Ushuaia, Argentina  
The new French double-decked aeroplane which enabled the famous explorer Amundsen to cover a wide angle of operation.

## Book Review

## SMALL FACTORY OUTPUT AND HOW TO SPEED IT

By George H. Marshall

McGraw-Hill Book Company, London. Pp. vi + 128.

This book does not deal specifically with airplane construction, but the methods which it describes are readily applicable to airplane work. It has, in fact, been written at a time of the greatest interest in airplane factories in Great Britain, as well as here, in view of the fact that the demand for airplanes with such matters as arrangement of factory departments, selection of men and change-bands, tools, stamps and instruments, work holding and progress records, raw material, stores and arrangements. Several special charts, such as flowcharts, show how these plans are based.

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*Los Angeles, Cal.*  
Eastern aeroplane factory  
*Site now being selected near New York*  
Experimental aeroplane factory  
*Dayton, O.*  
Aviation motor factory  
*New Brunswick, N. J. (Simplex Works)*  
Western flying field  
*Los Angeles, Cal.*  
Eastern flying field  
*Hempstead Plains, L. I.*  
Hydroaeroplane station  
*Port Washington, L. I.*  
Total men employed, 2362

## Capital Stock

7¢ cumulative convertible preferred,  
\$5,000,000 Common stock, of no par  
value, 500,000 shares

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